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**Lee**

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(54) **GOLF CLUB**

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**A63B 69/36** (2006.01)

**A63B 59/00** (2015.01)

(52) **U.S. Cl.**

CPC ..... **A63B 53/0466** (2013.01); **A63B 60/50** (2015.10); **A63B 2053/0458** (2013.01); **A63B 2053/0495** (2013.01)

(58) **Field of Classification Search**

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USPC ..... 473/324–350, 287–292, 457, 519  
See application file for complete search history.

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(57) **ABSTRACT**

A golf club having a face adapted to directly strike a golf ball thereon, a pipe-shaped shaft coupled to the club head, and a grip coupled to the top end periphery of the shaft, includes a first protrusion formed on one side of an internal surface of a face thereof; a second protrusion formed on the rear surface of the interior thereof in such a manner as to face the first protrusion and having a lubricating oil inlet passage formed thereon in such a manner as to be connected to the outside; a spring disposed engagedly between the first protrusion and the second protrusion; a bolt detachably mounted on the entrance of the lubricating oil inlet passage of the second protrusion; and an elastic structure slidingly operating along the spring in such a manner as to surround the spring.

**5 Claims, 3 Drawing Sheets**

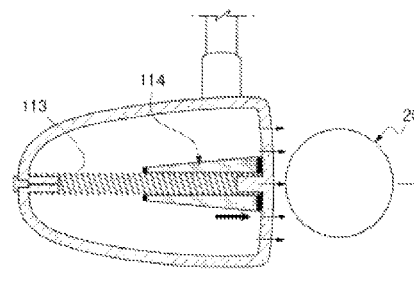
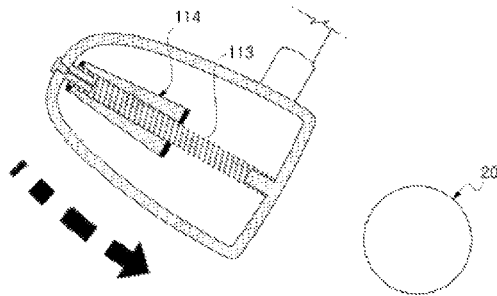


FIG. 1

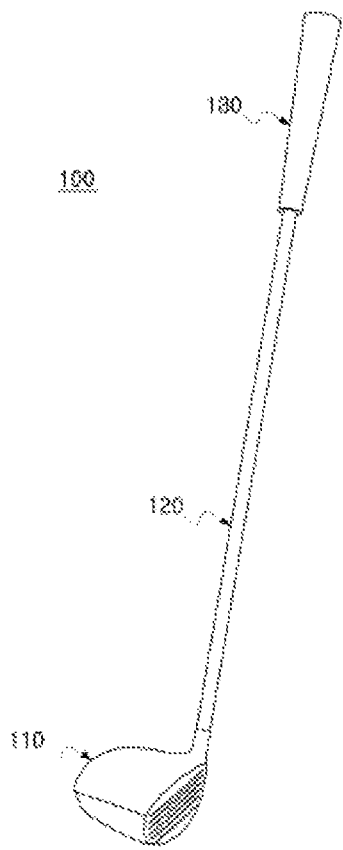


FIG. 2

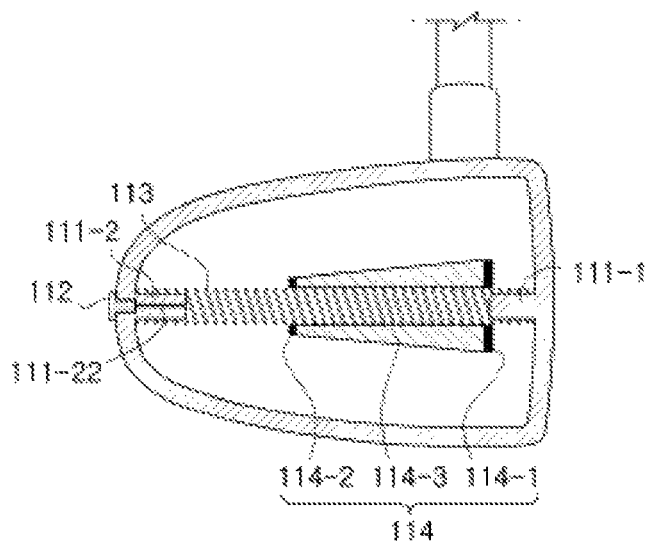


FIG. 3

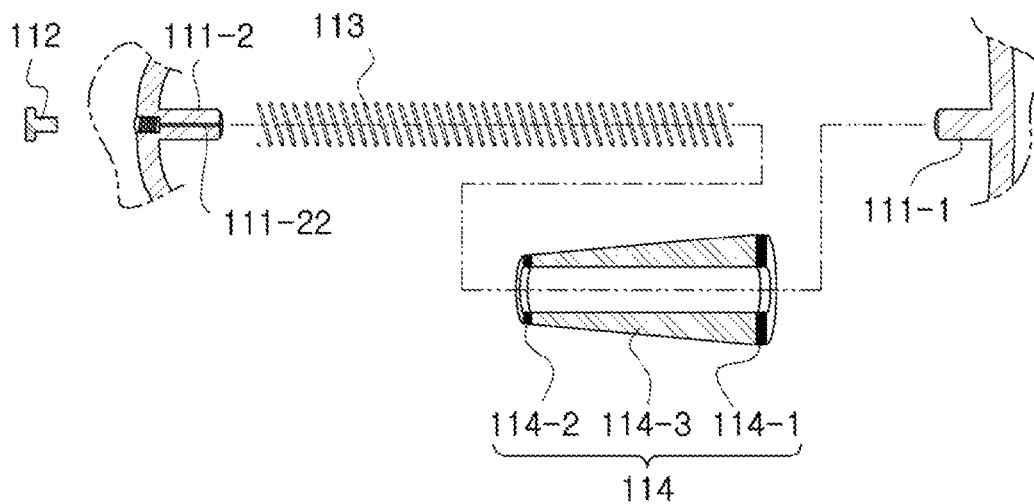


FIG. 4(a)

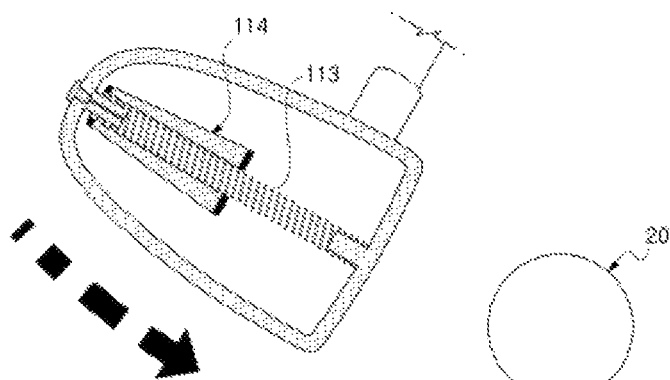


FIG. 4(b)

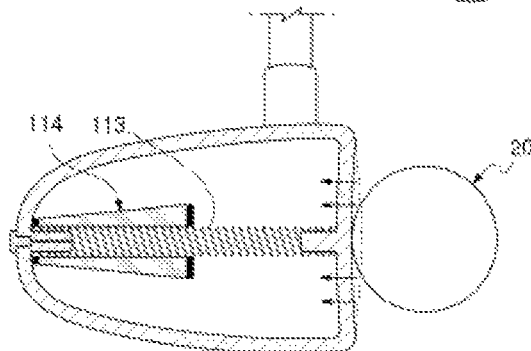
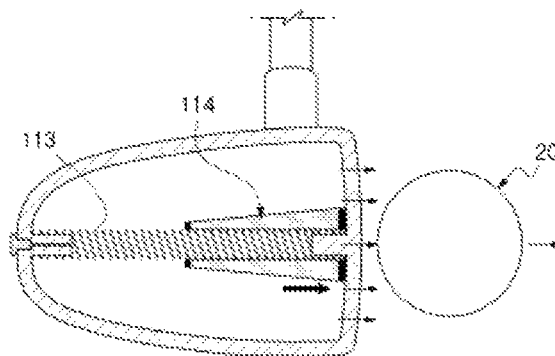


FIG. 4(c)



# 1

## GOLF CLUB

### CROSS REFERENCE

This application claims foreign priority under Paris Convention to Korean Patent Application No. 20-2014-0003126, filed 18 Apr. 2014, with the Korean Intellectual Property Office.

### BACKGROUND

The present invention relates to a golf club, and more particularly, to a golf club that has a structure of a club head capable of improving the distance of a golf ball.

Unlike other sports, generally, golf is the sport depending sensitively upon a player's drive shot and swing postures, a club's length, and his or her grasping state on a grip of the club.

There are three types of golf clubs used for striking a golf ball. Drivers are mainly used for the long distance fairway of the golf ball, irons for the positioning of the golf ball from a fair way to the green, and putters for rolling the golf ball into the cup.

Since the furthest distance of the golf ball is achieved with the drivers or irons among the golf clubs, it is very important to improve the distance of the golf ball through the drivers or irons. So as to maximize the distance of the golf ball, for example, conventional drivers or irons have heavy heads or long club lengths.

However, the conventional drivers or irons have the restrictions in the improvement of the distance of the golf ball due to a golfer's physical limits in using the heavy heads or long club lengths.

### SUMMARY OF THE INVENTION

Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a golf club that has a structure of a club head capable of optimizing a repulsive force generated from a face of the club head to improve the distance of a golf ball.

To accomplish the above object, according to the present invention, there is provided a golf club including: a club head having a face adapted to directly strike a golf ball thereon; a pipe-shaped shaft coupled to the club head; and a grip coupled to the top end periphery of the shaft, wherein the club head includes: a first protrusion formed on one side of an internal surface of a face thereof; a second protrusion formed on the rear surface of the interior thereof in such a manner as to face the first protrusion and having a lubricating oil inlet passage formed thereon in such a manner as to be connected to the outside; a spring disposed engagedly between the first protrusion and the second protrusion; a bolt detachably mounted on the entrance of the lubricating oil inlet passage of the second protrusion; and an elastic structure slidably operating along the spring in such a manner as to surround the spring.

According to the present invention, desirably, the elastic structure includes: a piston made of a high elastic metal and slidably operating along the spring in such a manner as to surround the spring; a first elastic member disposed on one surface of the piston in such a manner as to surround the spring; and a second elastic member disposed on the other surface of the piston in such a manner as to surround the spring.

# 2

According to the present invention, desirably, the high elastic metal includes any one of titanium, phosphor bronze made by adding phosphorus to bronze, and tungsten, and the first elastic member and the second elastic member are formed of a ring-shaped plate made of an elastic material.

According to the present invention, desirably, the piston has a shape of a circular truncated cone increased gradually in diameter as the piston goes toward one surface thereof from the other surface thereof.

According to the present invention, desirably, the piston has a shape of a cylindrical or polygonal post.

### BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view showing a golf club according to the present invention;

FIG. 2 is a sectional view showing the internal structure of a club head of the golf club according to the present invention;

FIG. 3 is an exploded sectional view showing the internal structure of the club head of the golf club according to the present invention; and

FIGS. 4a to 4c are sectional views showing the striking principle of the golf club according to the present invention.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Objects, characteristics and advantages of the present invention will be more clearly understood from the detailed description as will be described below and the attached drawings. In the description, it should be noted that the parts corresponding to those of the drawings are indicated by corresponding reference numerals. Further, the terms as will be discussed later are defined in accordance with the functions of the present invention, but may be varied under the intention or regulation of a user or operator. Therefore, they should be defined on the basis of the whole scope of the present invention. Therefore, they should be defined on the basis of the whole scope of the present invention. Furthermore, a detailed explanation on the well known components of the present invention will be avoided for the brevity of the description.

Hereinafter, an explanation on a golf club according to the present invention will be in detail given with reference to the attached drawing. FIG. 1 is a perspective view showing a golf club according to the present invention, FIG. 2 is a sectional view showing the internal structure of a club head of the golf club according to the present invention, and FIG. 3 is an exploded sectional view showing the internal structure of the club head of the golf club according to the present invention.

A golf club **100** according to the present invention serves to improve the distance of a golf ball, which is first applied to a driver, but may be of course applied to woods and irons.

The golf club **100** according to the present invention includes a club head **110** having an elastic structure **114** disposed at the inside thereof to improve a repulsive force against a golf ball when the club head **110** strikes the golf ball, a pipe-shaped shaft **120** coupled to the club head **110**, and a grip **130** coupled to the top end periphery of the shaft **120**.

## 3

As shown in FIG. 2, the club head **110** is a head housing portion constituting the outer shape thereof and includes a face adapted to directly strike a golf ball thereon, a first protrusion **111-1** formed at the center of the internal surface of the face, a second protrusion **111-2** formed at the rear surface of the interior thereof in such a manner as to face the first protrusion **111-1** and having a lubricating oil inlet passage **111-22** penetrated thereinto, a bolt **112** detachably mounted on the entrance of the lubricating oil inlet passage **111-22**, a spring **113** located engagedly between the first protrusion **111-1** and the second protrusion **111-2**, and an elastic structure **114** slidably operating in such a manner as to surround the spring **113**.

In more detail, the first protrusion **111-1** protrudes inward from one side of the internal surface of the face to correspond to a sweet spot of the face of the club head **110**, and at this time, the first protrusion **111-1** is fitted surroundedly to one side of the spring **113**.

Further, the second protrusion **111-2** protrudes inward from one side of the rear surface of the interior of the club head **110** in such a manner as to face the first protrusion **111-1** and has the lubricating oil inlet passage **111-22** connected to the outside. At this time, the second protrusion **111-2** is coupled to the spring **113** in such a manner as to be surrounded with the other side of the spring **113**.

Further, the lubricating oil inlet passage **111-22** is open or closed by means of the bolt **112** detachably screw-coupled to the entrance thereof, and lubricating oil is introduced into the lubricating oil inlet passage **111-22** to allow the elastic structure **114** to slidably operate gently along the spring **113**.

The elastic structure **114** includes a piston **114-3** made of a high elastic metal and slidably operating along the spring **113** in such a manner as to surround the spring **113**, a first elastic member **114-1** disposed on one surface of the piston **114-3** in the direction of the first protrusion **111-1**, and a second elastic member **114-2** disposed on the other surface of the piston **114-3** in the direction of the second protrusion **111-2**.

In this case, for example, the high elastic metal used to form the piston **114-3** includes titanium having a modulus of 107 GPa, phosphor bronze made by adding phosphorus to bronze, and tungsten W. Of course, the high elastic metal is not limited to the above-mentioned metals, but may be formed of all metals or alloys having high elasticity.

The first elastic member **114-1** and the second elastic member **114-2** are formed of a ring-shaped plate made of an elastic material like rubber, silicone, synthetic resin and so on, thus absorbing the impacts generated in the interior of the club head **110** upon the strike of the golf ball to prevent the piston **114-3** from being broken and to transmit the repulsive force against the golf ball to the face.

As shown in FIG. 3, the piston **114-3** has a shape of a circular truncated cone increased gradually in diameter as it goes toward one surface thereof in the direction of the first protrusion **111-1** from the other surface thereof in the direction of the second protrusion **111-2**. In this case, the reason why the piston **114-3** has the circular truncated cone is that the whole weight of the piston **114-3** is reduced and the repulsive force against the golf ball is effectively transmitted to the face.

In addition thereto, of course, the piston **114-3** may have shapes of cylindrical, rectangular, and polygonal posts.

At this time, one surface of the piston **114-3** on which the first elastic member **114-1** is disposed has the same diameter as or smaller diameter than the sweet spot of the face.

## 4

Under the above-mentioned configuration of the golf club **100**, according to the present invention, at the moment of the impact between the golf ball and the face, the face pressed against the golf ball hits back by means of the elastic structure **114** disposed inside the club head **110**, thus optimizing the repulsive force pushing the golf ball through the face to improve the distance of the golf ball.

Hereinafter, an explanation on the striking operation using the golf club **100** according to the present invention will be given with reference to FIGS. **4a** to **4c**. FIGS. **4a** to **4c** are sectional views showing the striking principle of the golf club according to the present invention.

As shown in FIG. **4a**, if the golf club **100** strikes the golf ball **20** in the state of being swung back, the face of the golf club **100** pushes inward by means of the golf ball **20**, and the striking load is transmitted to the elastic structure **114** through the face, as shown in FIG. **4b**.

At this time, the elastic structure **114** is located around the second protrusion **111-2** along the spring **113** in the state where the golf club **100** is swung back, and when the golf club **100** strikes the golf ball **20**, the elastic structure **114** momentarily slides along the spring **113** in the direction of the first protrusion **111-1**.

As the repulsive action against the impact applied to the face, as shown in FIG. **4c**, a reaction for rebounding the golf ball **20** is generated from the face of the club head **110**, and at the same time, the elastic structure **114** inserts the first protrusion **111-1** thereinto to hit back the rear surface of the face.

At this time, since the lubricating oil introduced into the lubricating oil inlet passage **111-22** is applied to the spring **113** and the elastic structure **114**, the elastic structure **114** slidably operates along the spring **113**, without having any friction against the spring **113**, and easily hits back the rear surface of the face.

According to the present invention, therefore, as the repulsive action against the striking of the golf ball **20**, the repulsive force generated from the face of the club head **110** and the repulsive force generated when the rear surface of the face is hit back by means of the elastic structure **114** are applied to the golf ball **20**, thus generating high repulsive force against the golf ball **20**.

As mentioned above, the golf club **100** according to the present invention can apply the repulsive force generated from the elastic structure **114** disposed inside the club head **110** as well as the repulsive force generated from the face of the club head **110** to the golf ball **20**, thus improving the distance of the golf ball **20**.

While the present invention has been described with reference to the particular illustrative embodiments, it is not to be restricted by the embodiments but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present invention.

What is claimed is:

1. A golf club comprising:

a club head having a face adapted to directly strike a golf ball thereon;

a pipe-shaped shaft coupled to the club head; and  
a grip coupled to a top end periphery of the shaft,

wherein the club head comprises:

a first protrusion formed on one side of an internal surface of a face thereof;

a second protrusion formed on a rear surface of an interior thereof to face the first protrusion and having a lubricating oil inlet passage formed thereon;

5

6

a spring disposed engagedly between the first protrusion and the second protrusion;

a bolt detachably mounted on an entrance of the lubricating oil inlet passage of the second protrusion; and

an elastic structure slidingly operating along the spring to surround the spring. 5

2. The golf club according to claim 1, wherein the elastic structure comprises:

a piston made of a high elastic metal and slidingly operating along the spring to surround the spring; 10

a first elastic member disposed on one end surface of the piston to surround the spring; and

a second elastic member disposed on an other surface of the piston to surround the spring.

3. The golf club according to claim 2, wherein the high elastic metal comprises any one of titanium, phosphor bronze made by adding phosphorus to bronze, and tungsten, and the first elastic member and the second elastic member are formed of a ring-shaped plate made of an elastic material. 15 20

4. The golf club according to claim 2, wherein the piston has a shape of a circular truncated cone.

5. The golf club according to claim 2, wherein the piston has a shape of a cylindrical or polygonal post. 25

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